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Identification of Infectious Bronchitis of Chickens in England

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During the autumn of 1947 many outbreaks of Newcastle disease were reported. The origin of a large proportion of these outbreaks was traced to the sales of poultry by several dealers. Upon investigation, it was found that whilst some of the chickens sold by these dealers developed typical Newcastle disease or were responsible for spreading typical Newcastle disease to the stock of the purchaser, in many cases only mild "colds" were observed. Sera of some chickens which were convalescent or had recovered from such colds when tested by the haemagglutination-inhibition test with Newcastle disease virus showed no inhibition power. In order to make further studies, live chickens showing evidence of respiratory disease were obtained from three sources. The disease was readily transmitted in the laboratory by nasal or tracheal instillation of nasal exudates or tracheal suspensions from the donor fowls. The results reported here lead to the conclusion that this respiratory disease is identical with infectious bronchitis.

History.—Infectious bronchitis was first described in baby chicks by Schalk and Hawn, 1931. These authors believed that it was widespread in the middle western States of America. A probably identical disease was described by Bushnell and Brandly, 1933; by Beach and Schalm, 1936, in California; and by Beaudette and Hudson, 1937, in New Jersey. The American observers recorded that infectious bronchitis was an acute highly infectious disease affecting chicks of two to three days to four weeks of age. Older birds were more resistant. Morbidity varied from 25 to 75 per cent., or even higher. Mortality amongst affected chicks was 40 to 90 per cent. The duration was short, six to ten days. The disease was caused by a virus which passed Berkefeld V, N and W filters.

Respiratory symptoms were prominent, and included gasping, moist râles, low rattling sounds, hoarse chirps, sneezing, and sometimes nasal discharge. Sometimes chicks assumed a sleepy appearance under the hover, sitting with heads retracted. The head might be stretched upward and forward when gasping. *Post-mortem* lesions were confined to the respiratory tract. Mucus or caseous plugs were seen in the trachea or bronchi. The air sac membranes were turbid and the air sacs sometimes contained caseous exudate.

Infectious bronchitis was most frequently noted by Delaplane and Stuart, 1939, in semi-mature and adult fowls, in which it produced no significant mortality.

Whilst this disease may have a wide geographical distribution, no authentic record of its existence outside the U.S.A. has been reported.

Origin of the English Strains of Virus.—Chickens which had been distributed by three dealers operating from Yorkshire, Essex and Surrey respectively served as donors. The symptoms exhibited by the donor fowls from the different sources were similar but varied in severity. Sneezing and watery nasal discharge, which sometimes formed gelatinous plugs which sealed the nostrils, was frequent; occasionally, lachrymation and facial swelling. Gurgling and rattling sounds were particularly pronounced at night. The nasal mucosa was swollen and congested and the passages contained excess mucus. The tracheal mucosa was oedematous and infiltrated with leucocytes, and the lumen contained excess mucus. The air sac membranes were thickened as a result of oedema and fibrinous deposit. In chronic cases the air sacs were distended with caseous casts. The duration of illness in the donor fowls varied from a few days to two to three months.

The disease was transmitted to three to four months' old R.I.R. chickens by pen contact, by nasal instillation of suspensions of tissues of the respiratory tract, and also by 0·4μ to 1·0μ A.P.D. gradocol filtrates of these suspensions. As a result of these transmissions, three strains of virus, A, R and W, were obtained from the three sources. The virus strains were maintained in growing chickens for several passages and induced a disease similar to that observed in the donor fowls.

An experiment was carried out to determine the relationship of these strains. Chickens which had recovered from infection with strains A, R or W were challenged by nasal instillation with each of the other strains. The results in Table I demonstrate the immunological identity of the three strains.

TABLE I

THE IMMUNOLOGICAL IDENTITY OF STRAINS A, R, AND W

Chicken number	Primary infection strain	Incubation period (days)	Duration of symptoms (days)	Interval between recovery and reinoculation (days)	Challenge virus strain	Reaction
958	A	3	4	153	A	No symptoms
975	A	3	7	125	A	"
1280	A	2	9	188	A	"
1976	A	2	43	10	W	"
2050	A	4	12	28	W	"
1824	A	5	26	14	R	"
1219	A	3	18	35	R	"
1378	R	6	54	12	A	"
1574	R	5	33	16	A	"
1486	R	2	19	14	A	"
128	R	2	63	22	W	"
858	R	3	27	30	W	"
1124	W	3	66	10	A	"
1263	W	4	37	18	A	"
1575	W	2	28	27	A	"
1328	W	2	28	19	R	"
1359	W	3	18	29	R	"
1456	W	3	10	37	R	"

The duration of the disease was shortest in chickens 958, 975 and 1280 (Table I). These were inoculated as week-old chicks with virus which had been passaged in young chickens. The remaining chickens were initially inoculated with crude suspensions from the original donor fowls or similar material from later passages in growing chickens. The course in all these fowls was more protracted and was characterised by a greater tendency for formation of accumulations of caseous pus in the air sacs, under the eyelids, and in the facial sinuses. It is possible that miscellaneous bacteria were complicating the virus infection at this time.

The results indicated that immunity following infection with Strain A persists for at least six months.

In view of the apparent identity of the three viruses, Strain A was selected for further study.

Strain A Infection in Young Chickens.—A virus line was established by the intratracheal inoculation of seven-day-old chickens with a 0·5μ A.P.D. gradocol filtrate of nasal and tracheal suspension. This line has been maintained in chickens 7 to 14 days old through 36 passages at weekly intervals. These transmissions involved 251 chickens. Whereas all inoculated chickens have developed respiratory symptoms, total mortality has been only six chickens. Incubation period was one to five days, usually two to three days. Most pronounced symptoms were sneezing, moist râles, hoarse chirps, low rattling and whistling sounds in the chest. Nasal discharge was almost invariable following nasal instillation but was less frequent following infection by the intratracheal route or by pen contact.

Affected chicks remained bright and active with no loss of appetite and little or no check to growth rate. There was no change in virulence as a result of serial transmission. The duration of the disease in inoculated chicks varied from two to three to 12 days, most usually six to nine days.

Post-mortem lesions resembled those described for infectious bronchitis, mucoid tracheitis and bronchitis and turbidity of the air sac membranes being most prominent.

Strain A Infection in Growing and Adult Chickens.—Intranasal and intratracheal inoculation of older chickens with chick-passaged virus has regularly resulted in a mild infection. Symptoms appeared

after an incubation of one to four days and consisted of sneezing, watery nasal discharge and throat rattle. The course was brief, symptoms having disappeared in five to seven days. Four fowls, inoculated intramuscularly, failed to develop symptoms. These results indicated a marked change in the severity of the disease when compared with that seen in the donor fowls and the early passages in growing chickens.

Chickens which had recovered from Strain A virus infection were fully susceptible to infectious laryngotracheitis, fowl pox and Newcastle disease (Hertfordshire 1933 strain). Chickens which had survived these diseases remained susceptible to Strain A virus infection.

Identification of Strain A Virus.—A pathogenic strain of infectious bronchitis virus was obtained through the courtesy of Dr. M. S. Hofstad, Iowa State College. This strain, when inoculated into young chickens, induced a disease symptomatically identical with that induced by Strain A. A cross immunity test employing chickens recovered from the American and the English, Strain A, viruses showed them to be immunologically identical. (Table II.)

TABLE II

THE IMMUNOLOGICAL IDENTITY OF STRAIN A, WITH INFECTIOUS BRONCHITIS VIRUS

Number of chickens	Primary infection	Challenge infection	Reaction
6	Strain A virus	Strain A virus	No reaction
6	None	Strain A virus	All developed respiratory symptoms
5	Strain A virus	Infectious bronchitis	No reaction
5	Infectious bronchitis	Infectious bronchitis	No reaction
5	None	Infectious bronchitis	All developed respiratory symptoms
5	Infectious bronchitis	Strain A virus	No reaction.

The sera of three chickens immunised against Strain A were tested in embryonated eggs for virus-neutralising antibody for the American strain of infectious bronchitis.

Chickens 2611 and 2615, after recovery from the primary infection, were reinjected intramuscularly six times at weekly intervals with 1·0 ml. of undiluted amnio-allantoic fluid of embryos dead of Strain A infection. Chicken 1475, after recovery, was twice reinoculated by intranasal instillation with chick-passaged Strain A virus. The sera of all three chickens neutralised more than 10,000 embryo lethal doses per ml.

Propagation of the Virus in Embryonated Fowl Eggs.—A line of virus was established by inoculation into the chorio-allantoic sac of ten-day embryonated eggs with a 1·0μ A.P.D. gradocol filtrate of nasal exudate. This line has now been maintained in eggs through 25 serial passages. Few deaths resulted during the first passages. The virulence for chick embryos was gradually increased so that by the 14th passage and thereafter the majority of the embryos died between the second and seventh day. The most conspicuous change was a stunting of the embryo, which appeared shrunken. The skin and membranes were somewhat congested. No characteristic lesions were observed. Confirmation of growth of virus was obtained at each passage by inoculation of young chicks with undiluted amnio-allantoic fluid. The disease induced in chicks by egg-passaged virus has shown a progressive tendency to become more mild. Similar findings were recorded by Beaudette and Hudson, 1937, and, Delaplane and Stuart, 1941.

Differential Diagnosis.—The circumstances under which infectious bronchitis was recognised point to the likelihood of the widespread existence of this disease. It is probable that many outbreaks which have been diagnosed as contagious catarrh, colds, etc., have, in fact, been caused by this virus. Whilst a laboratory examination may be necessary to identify infectious bronchitis, the history, symptoms, lesions, and course in many instances, should be sufficient to differentiate it from the other specific respiratory diseases of fowls known to occur in Britain.

Fowl Coryza (*Haemophilis gallinarum* infection).—This disease is frequently characterised by oedematous swellings of the face and wattles from which *H. gallinarum* can be isolated. Facial oedema is infrequent in infectious bronchitis. The incubation period of fowl coryza is short, experimental fowls usually show symptoms within 24 hours of inoculation.

Delaplane, 1943, states that sulphathiazole given to coryza infected fowls in a dose of one to two grammes daily, hastens recovery, usually within 48 to 72 hours, and that this drug could serve as an aid in diagnosis.

Infectious Laryngotracheitis.—Laryngotracheitis in its typical form is characterised by haemorrhage in the trachea and false membrane formation in the larynx and trachea. In infectious bronchitis the mucous membrane of the trachea remains intact and haemorrhage does not occur.

Fowl Pox.—Typical fowl pox lesions of the skin are easily noted and, if present, there is no problem of diagnosis. Pox lesions involving the trachea and larynx may be confused with those of laryngotracheitis, but they do not resemble infectious bronchitis in which there is no ulceration or necrosis.

Newcastle Disease.—The virulent form of Newcastle disease presents no difficulty in diagnosis. The milder respiratory form closely resembles infectious bronchitis. An association of respiratory and nervous symptoms is suggestive of this form of Newcastle disease since nervous symptoms have not been observed in infectious bronchitis. However, evidence exists that nervous symptoms may be absent in some outbreaks of mild Newcastle disease.

Egg-propagated infectious bronchitis virus does not agglutinate washed fowl erythrocytes whilst Newcastle disease virus does. This provides a ready means of differentiation. The sera of fowls recovered from infectious bronchitis does not give a positive reaction for Newcastle disease in the haemagglutination-inhibition test.

Summary

Three strains of virus, A, W and R, were isolated from fowls distributed by poultry dealers from Yorkshire, Surrey and Essex.

Cross immunity tests demonstrated that the three strains were identical.

Strain A was proved to be immunologically identical with an American strain of infectious bronchitis virus by cross-immunity and serum neutralisation tests.

In the donor fowls the disease was characterised by sneezing, nasal discharge, respiratory distress and rattling sounds which were most pronounced at night. The disease was often quite severe and of long duration, and there was a tendency for accumulations of pus to form in the air sacs and facial sinuses.

Filtrates and egg-passaged virus induced a milder disease characterised by sneezing, nasal discharge, gurgling and rattling respiratory sounds. This form was usually followed by recovery in six to ten days and immunity lasting at least six months.

Acknowledgment.—The writer is indebted to A. M. Smither for technical assistance.

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ABSTRACT

[Hotis Test Reaction Produced by Toxigenic Coagulase-positive Staphylococci. SCHALM, O. W. (1948.) *Amer. J. vet. Res.* **9.** 11.]

The author has explored the value of the Hotis Test for the detection of $\alpha\beta$ coagulase-positive staphylococci in 2,889 milk samples drawn from a herd of 247 milking cows. Simultaneous cultural examinations in blood agar plates revealed the presence of 559 positive samples whereas by the Hotis test 326 (58 per cent.) manifested typical reactions which were usually indicated by the appearance of greenish colonies with white centres adhering to the bottom of the vial after 20 hours' incubation. On the other hand, 8·9 per cent. of the total samples gave positive reactions due to non-pathogenic staphylococci or other organisms. It was found an advantage to read the Hotis Test after 20 and 40 hours' incubation in order to detect the maximum number of positive samples. A combination of the two readings made on 1,733 milk samples, among which 325 contained pathogenic staphylococci, led to the detection of 80 per cent. of the 325 samples, and to 20 per cent. false positives. The greatest drawback to the test is that what is considered as a typical reaction may also be due to *Str. agalactiae* or to other organisms.

S. J. E.

WEEKLY WISDOM

". . . *There is only one simple guide in times of difficulty and that is to do what is right and honourable. It is not only the most proper thing to do but also in most cases the safest course to take.* . . ."—Mr. WINSTON CHURCHILL receiving the Freedom of the City of Cardiff, July 16th, 1948.

A Survey of Canine Leptospirosis in England

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Interest in the subject of canine infection with *Leptospira canicola* has been stimulated in this country by the findings of Joshua & Freak (1947) that penicillin is of great value in the treatment of canicola fever. Until recently "yellows," the other leptospiral infection of dogs, shown by Okell, Dalling & Pugh (1925) to be caused by *L. icterohaemorrhagiae*, had received more attention, because serious outbreaks of the disease occur from time to time in kennels and breeding establishments. The literature of the subject has been reviewed by Mills (1948) and need not be discussed here.

Both forms of leptospirosis appear to be of world-wide distribution, and surveys of their prevalence in dogs have been carried out in a number of countries. In Table I is set forth a representative selection of the published findings which show that a considerable, though variable, proportion of healthy dogs present serological evidence of past infection.

Table I

Infection Rate of Healthy Dogs with *Leptospirae*

Reference	Place	No. tested	Total infection. Per cent.	Percentage infected with *L. icterohaemorrhagiae*	Percentage infected with *L. canicola*	Proportion *L. ict.*/*L. can.*
Stuart (1946)	Glasgow	100	4·0	0	4·0	—
Van der Walle (1939)	Antwerp	100	44	15	29	1 : 2
Bessemans *et al.* (1938)	Ghent	68	1*	1	0	—
Uhlenhuth & Zimmermann (1936)	Freiburg	90	15–20	—	—	1 : 2
Babudieri & Castagnoli (1940)	Rome	159	36	33	3	11 : 1
Azevedo (1943)	Lisbon	125	18	5	13	1 : 2·5
Meyer *et al.* (1939)	New York	114	12	3	9	1 : 3
Newman (1947)	Michigan	500	29	2	27	1 : 13
Savino & Rennella (1944)	Buenos Aires	390	31	0·3	25†	1 : 75
Ahcata & Breaks (1943)	Honolulu	100	39	20	19	1 : 1

* One dog positive. † Remainder infected *L. bonarienis*

The present investigation developed because of the need for a freshly isolated strain of *L. canicola* for experimental work. Considerable numbers of dogs are used at Wellcome Physiological Research Laboratories for the production of distemper immune serum, and they are obtained from a variety of sources. It seemed likely that animals, recently recovered from canicola fever and still carrying leptospirae in the kidneys, might be imported from time to time. All these dogs come finally to autopsy, so that the kidneys would be available for examination, and also for inoculation into hamsters (*Cricetus auratus*) which are very susceptible to infection with *L. canicola*, as was first shown by Morton (1942). Evidence of past infection was sought by testing the agglutination reaction of a sample of serum against *L. canicola* and *L. icterohaemorrhagiae*. In the cases where a positive result was obtained, the kidneys were brayed in a mortar with normal saline. The suspension was examined microscopically for the presence of leptospirae, and a pool of material from four to six dogs was injected intraperitoneally into hamsters.

As the autopsies and the animal inoculations were carried out in different parts of London, there was an interval of 24 hours or more between the two operations. Smith (1938) found that isolation of *L. icterohaemorrhagiae* from rats was difficult unless the animals were brought to the laboratory alive so that the kidneys could then be examined, and the suspension injected into guinea-pigs immediately after autopsy. We hoped that refrigeration of the dogs' kidneys would overcome the difficulty introduced by the transport delay, but this proved not to be so. Material from 78 dogs, positive by serological tests, was examined and inoculated without once finding leptospirae or producing infection.

Although the primary object of the investigation was not attained, our interest was aroused by the high rate of infection among these dogs. The serological tests were therefore continued to provide data about the frequency of infection.

Material and Method

Subjects.—A total of 403 dogs between the ages of one and three years was examined. They were obtained mainly from three areas in England, namely, London and the Home Counties (102), the Midland agricultural counties (122) and Yorkshire towns (126). The remaining 53 came from the Liverpool area and Northern Ireland. Greyhounds, terriers, collies and retrievers comprised three-quarters of the total, but a number of the medium-sized and larger breeds were represented also. The sex was not recorded.

Agglutination Test.—The technique was that used by Schüffner & Mochtar (1927) with the modifications described by Broom (1948). Briefly, it consists in mixing dilutions of the test serum with a formalinised suspension of leptospirae. Interaction is allowed to take place for 18 to 24 hours at 5° C., and the mixtures are then examined microscopically for the presence of agglutination.

In this investigation a preliminary test was carried out with serum dilutions of 1 : 10 and 1 : 30. Each serum which showed agglutination was re-tested to determine its full titre, using dilutions of 1 : 10, 1 : 30, 1 : 100, 1 : 300, etc.

It is generally agreed that specific agglutination of leptospirae by serum does not occur in the absence of infection (present or past) and that agglutination, even if present only in low dilution, is proof of such infection. (The evidence on which this conclusion is based is reviewed by Broom, 1948.) In this survey, therefore, we have accepted agglutination in serum dilutions of 1 : 10 or more as evidence that the dogs had previously suffered from leptospirosis.

A certain degree of co-agglutination frequently occurs. In most instances the titre is much higher for the homologous leptospira, thus allowing a diagnosis to be made. Occasionally, however, the titres for the two species are approximately the same, and then the species can be determined only by cross-absorption tests. When the original titres are low, the results are not very satisfactory, and the method was not used in this work.

Results

Anti-leptospiral agglutinins were present in the sera of 108 (27 per cent.) of the 403 dogs tested. The maximum titres are set out in Table II, and from these the degree of co-agglutination can be seen. For example, of the 17 sera which agglutinated *L. canicola* in dilutions up to 1 : 1,000, seven were negative with *L. icterohaemorrhagiae*; one had a titre of 1 : 10, five of 1 : 30, three of 1 : 100, and one of 1 : 300.

Table II

Titres of 108 Sera against *L. icterohaemorrhagiae* and *L. canicola*

Titre against *L. canicola*	Titre against *L. icterohaemorrhagiae* 0	1 : 10	1 : 30	1 : 100	1 : 300	1 : 1,000	1 : 3,000
0	295	—	2	4	—	—	—
1 : 10	2	**—**	**—**	1	—	—	—
1 : 30	19	**2**	**5**	**—**	—	—	—
1 : 100	24	6	**2**	**1**	**—**	1	1
1 : 300	12	1	1	**2**	**—**	**—**	—
1 : 1,000	7	1	5	3	**1**	**—**	**—**
1 : 3,000	3	—	1	1	—	**—**	**—**

0 = Negative at serum dilutions of 1 : 10

When the titre of a serum was at least ten times greater for one species than the other, the higher was accepted as being specific, and the lower as due to co-agglutination. Where the difference was less it was considered impossible to determine the infecting leptospira by agglutination tests alone. The heavy type in Table II denotes the area into which fall the results (13 in number) which cannot be interpreted without absorption tests. Readings above and to the right hand side indicate infection with *L. icterohaemorrhagiae* (nine), and those below and to the left with *L. canicola* (86), a proportion of about 1 : 10.

Fig. 1 shows diagrammatically the distribution of the maximum specific titres for the cases where the species was known. Doubtful cases and co-agglutination titres have been excluded. The modal titre against *L. canicola* is 1 : 100 and 65 of the sera agglutinated in dilutions of 1 : 100 or higher. Unfortunately, very little is known about the rate at which the agglutinin content falls after recovery,

so no conclusions can be drawn concerning the time which had elapsed since these dogs were infected.

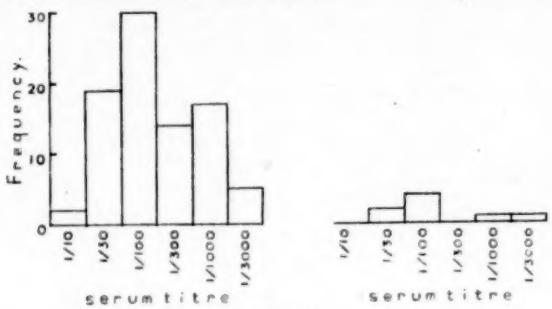

Fig. I

It was noted above that the dogs were drawn mainly from three areas in England, and also that four breeds contributed three-quarters of the total number. In Table III the numbers of dogs which reacted positively in each subgroup are compared with the numbers which would be expected theoretically if all the animals were drawn from a homogeneous population. The final column shows the probabilities that the differences between these numbers would occur as the result of random sampling from such a population.

Table III

Comparison of Infection Rates among Dogs of Different Places of Origin, and Different Breeds

Origin or breed	Number examined	Number of positives		Difference	P
		Observed	Expected		
London, etc.	102	34	27·3	+ 6·7	0·2
Midlands	122	20	32·7	— 12·7	0·03
Yorkshire	126	37	33·8	+ 3·2	0·6
Greyhound	90	26	24·1	+ 1·9	0·7
Terrier	90	22	24·1	— 2·1	0·7
Collie	67	16	17·0	— 1·0	0·8
Retriever	48	14	12·9	+ 1·1	0·7
Other breed	108	30	28·9	+ 1·1	0·8

P = Probability of obtaining as large a difference as the result of chance.

Values of P between 0·1 and 0·9 (which mean that differences as great as those found would occur by chance from one to nine times in ten trials) are accepted as indicating homogeneity. In our series the results for dogs drawn from the agricultural Midlands are the only ones which lie outside this range. This difference is likely to be obtained only three times in 100 trials. Although this is not statistically significant, it suggests that these dogs probably ran a lower risk of infection than the animals from the more heavily populated areas.

Summary

1. Samples of serum from 403 dogs between one and three years of age were tested for the presence of agglutinins against *Leptospira canicola* and *L. icterohaemorrhagiae*.

2. Positive results were obtained from 108 dogs (27 per cent.). Of these, 86 were due to *L. canicola* and nine to *L. icterohaemorrhagiae*. In the remaining 13 instances the infecting species could not be determined by the methods used.

3. The infection rate was the same for different breeds of dogs.

4. Dogs from agricultural areas had a suggestively, but not significantly, lower rate than those from towns.

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ANNOTATION

Animal Leptospirosis as a Human Hazard in Britain

The part played by rats, which are often carriers of *Leptospira icterohaemorrhagiae*, in the causation of Weil's disease in man is too well known to need further emphasis. The same leptospira produces "yellows" in dogs[15], and men have contracted Weil's disease from dogs.[10, 12, 14, 16] The infection has also been transmitted by pigs[9, 19], by the bite of a ferret[1, 4] and possibly by a cat[22], though the evidence for the last is not very conclusive. An epidemic of leptospiral jaundice has been reported among silver foxes[5] but apparently no human cases resulted.

The position as regards *L. canicola* and canicola fever is not so clear-cut. This leptospira is certainly highly infective for dogs[6] and, perhaps often in a mild form, the disease must be very common in this country, because a serological survey of street dogs in Glasgow[21] showed a 40 per cent. infection rate. It has generally been held that canicola fever occurs more frequently in older dogs, but in a recent survey of dogs between one and three years of age[3] 15 to 20 per cent. of the animals showed evidence of past infection. The attack rate, of course, is even higher, because these figures give no indication of the number of fatal cases. On the other hand, canicola fever is apparently a rare disease in man, for only about 100 cases have been reported from all over the world.[13] Nearly two-thirds of this total, however, were diagnosed in Holland and Denmark—countries where the risk of leptospirosis is keenly appreciated—so it may be that a considerable number of cases occur in other countries without being recognised. There have been five human cases[2, 11] reported from England, and three of these were within a period of one month. The disease was of a mild character in these patients, and they all presented symptoms of aseptic meningitis. This seems to be the commonest form of the affection, although jaundice was reported in six cases[13] and there has been one death.[18]

The dog is the only known carrier of *L. canicola*, and infection appears to occur, mainly at least, by direct transmission of the leptospirae from dog to dog, or from dog to man. During the later stages of the illness, and for some months after recovery, leptospirae are shed in the urine and can remain alive and active for a number of days in wet, slightly alkaline surroundings such as stagnant water.

Two small human outbreaks, each of three cases and remarkably alike in essentials, were described in Holland[17] and France[20] and may be used for illustration. In each instance a bitch and her puppies were found to be excreting leptospirae in the urine, and the human infections occurred in families which received puppies. There was one English case[11] in which the patient had a puppy which was ill-trained and dirty, and the woman often had to mop up urine and faeces. These examples suggest that frequent contact with infective material may be an important factor. There are, however, cases in which no history of direct association with sick dogs can be obtained. One patient[2] is believed to have been infected while bathing, and it has been thought[23] that dogs also may acquire the disease through the medium of contaminated water.

When the small number of human cases is considered in relation to the high rate of canine infection and the close contact between men and dogs, it seems reasonable to assume that *L. canicola* has a low pathogenicity for man. Even so, it would be wise for the owners of sick dogs to be aware of the chance of infection, and to be advised to take precautions in the disposal of the animal's dejecta.

An interesting observation was made during a study of the wood mouse (*Apodemus sylvaticus*) near Oxford.[7] Leptospirae were seen in the kidneys of a number of mice, but it proved impossible to obtain cultures, and the species was not determined. On the continent of Europe this mouse is a carrier of both *L. sejroe* and *L. bataviae* which cause a mild illness, similar to and easily mistaken for influenza. No cases of these forms of leptospirosis have been diagnosed here, nor has "swineherd's disease"[8] which resembles canicola fever in its clinical manifestations ever been recognised in Britain, although it has frequently been described in continental countries. The infecting organism is *L. pomona*, of which domestic pigs may be symptomless carriers.

J. C. B.

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CLINICAL COMMUNICATION

Ovarohysterectomy in the Bitch

With Emphasis upon Technique used in America

E. W. JONES, M.R.C.V.S.

Cornell University Graduate School

Although it is fully realised that this operation is well known and has been aptly described on many occasions, it is intended to repeat the basic technique, laying emphasis upon that commonly used in the U.S.A.

The large number of dogs spayed in the U.S.A. is quite surprising. In New York State, there are at least two reasons for this—firstly, the fact that the cost of a licence for a bitch that has been spayed is less than for the unspayed animal; secondly, it assists the control of rabies, limiting the possibility of spread from wandering males. Naturally the animals are operated upon at varying ages, but they are preferred at approximately six months old. If they are operated upon much before this, there is danger of failure to develop to full maturity.[1] If they are left longer, there is always the probable need for ligation of ovarian and posterior uterine vessels because of their increased size due to development, oestrus, or pregnancy.

Pre-operative Preparation

It is preferable to starve the animal for the meal previous to the operation. This decreases the mass of the abdominal contents and especially the size of the stomach, which may displace the spleen so that it lies directly beneath the site of the incision. As the usual anaesthetic employed is nembutal (Abbot), the spleen is considerably swollen and is easily punctured when so displaced, if adequate care is not exercised. The resulting haemorrhage is extremely difficult to control and may necessitate splenectomy. The bladder should also be emptied in order to avoid unnecessary hindrance while operating.

Anaesthesia and Restraint

Nembutal is the usual anaesthetic and is given slowly into the cephalic vein until the required depth is obtained. The site (mid-line) is shaved, cleansed, disinfected, and protected with a piece of sterile gauze. The dog is placed upon the operating table and restrained in dorsal recumbency. It is perhaps convenient to mention here, that if it should be necessary to give a stimulant or additional anaesthetic, the sublingual vein is often the most accessible for this purpose. The tongue is drawn out to one side and held with the left hand (right-handed operator), the index finger exerting pressure upwards from the dorsal surface of the tongue so that the more proximal part of the tongue is pressed against the lower molars (the animal is in dorsal recumbency). This serves to make the vein more prominent by arching the ventral surface of the tongue and by occluding it as it passes beneath the lower molars. It is preferable to approach the vein from beneath it in order to avoid any oozing of blood from the needle puncture. Thus the needle is inserted into the musculature of the tongue at a slight angle to the midline and is then redirected upwards into the vein (see diagram) when the needle can be seen directly under the mucosa. The needle is then threaded a little way along the vein, and if necessary a little blood may be withdrawn into the syringe to make certain it is within the vessel.

Instruments

The only instrument which in any way varies from those commonly used in England is the Ferguson angiotribe or haemostatic forceps (see diagram). Three of these are used for controlling haemorrhage at the ovarian and uterine stumps.

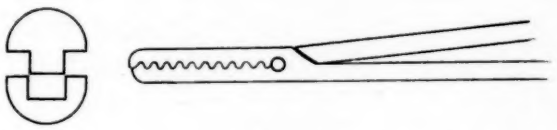

Diagram showing cross section and lateral view of jaws of Ferguson forceps.

Technique

The sterile gauze is removed from the operative site, and one or more drapes are applied. The incision, about half to one inch long, is made in the midline just behind the umbilicus—there is usually a slight depression at this site when the animal is lying on its back. The tissues incised are skin, subcutis, linea alba, and peritoneum. The incision through linea alba is facilitated if the animal is exactly on its back and not slightly to one side or the other. This type of incision reduces haemorrhage and aids closure, for no muscles are incised. The peritoneum being punctured, the incision in it is extended to the required length. Once this is completed, an assistant tilts the operating table to an angle of approximately 45° with vertical, in order that the abdominal viscera may fall forwards and the uterine cornua be made more accessible. One side of the incision is retraced with a hook while a second hook is inserted to the roof of the abdomen in order to engage the broad ligament or the uterine horn itself. It is essential when inserting this hook to keep its convexity pressed against the abdominal wall, following the curvature of the wall as far as possible. When the instrument is against the roof of the abdomen, it is brought carefully up into the incision. The uterine horn may not be seen when the hook is first brought into view because of a fold of fatty tissue around the hook. This fat is within the broad ligament, and gentle traction upon it will bring the horn into sight. As soon as the uterine horn is found, the operating table is returned to its normal position, for the inclined position is no longer of any advantage and there is no object in having the weight of the abdominal contents continuing to press against the diaphragm. Next the ovaries are brought through the incision. If any difficulty is experienced in doing this, the suspensory ligament of the ovary is ruptured by the index finger. When traction is exerted upon the ovary, this ligament is felt as a tense strand running from the ovary to the visceral surface of the posterior ribs.[2] Steady and increasing pressure is exerted upon the ligament by the finger until the ligament ruptures. This allows the ovary to be brought into the incision, and the mesovarium is clamped with Ferguson forceps, care being taken to include the anterior uterine branch of the ovarian vessel. A second Ferguson forceps is applied above the first and as close as possible to it. By twisting and slight traction on the forceps, the mesovarium is severed. The second ovary, located by tracing its accompanying horn from the body of the uterus, is treated in exactly the same way. The first mesovarial stump is returned to a point as near as possible within the abdomen to that which it will subsequently occupy, and the forceps then removed from it. The broad ligament is separated from the horns, and the body of the uterus together with the nearby posterior uterine vessels is clamped and is treated in the same way as the mesovarium. The remaining forceps are removed in a similar manner as that described for the previous one. Should it be necessary, transfixing ligatures, in addition to forceps, are applied to the ovarian and uterine stumps. This is especially necessary in older animals. The incision is closed with one or two sutures through peritoneum and muscle layers. Similarly, one or two are placed in the skin. The type of suture and material used depend upon the individual. A vertical mattress or a figure of eight is suitable for skin (see diagram).

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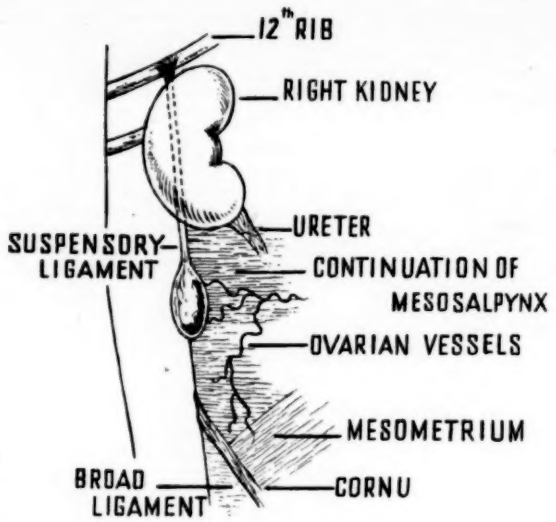

Diagram showing location of suspensory ligament of the right ovary of the bitch.

Diagram of vertical mattress and figure of eight stitch.

Post-operative Care and Complications

The post-operative care varied considerably. A common method is to bandage a sterile pack over the incision and to remove it, together with the stitches, after five to seven days.

Regarding complications, there is, of course, the ever present possibility of sepsis and haemorrhage. One aspect of the former, perhaps worthy of mention, is an infected ovarian ligature. Should the material used be non-absorbable, this will result in a chronic, persistent, discharging sinus. In attempting to remove the source of trouble, difficulty is experienced with extensive adhesions and the mass of chronic inflammatory tissue surrounding the ligature. Puncture of the spleen has been discussed previously, and leaves only the possibility of wound breakdown to be mentioned. This, when it occurs, invariably co-exists with the use of catgut. The breakdown of the wound results from two possibilities—faulty knots or too rapid absorption of the catgut. It is interesting to note that students using chromic catgut in practical surgery classes, New York State Veterinary College, experienced wound breakdown in approximately 50 per cent. of operations. Insistence upon the use of at least a triple throw knot and an additional row of sutures reduced this incidence.

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FOOD AND DRUGS (MILK AND DAIRIES) ACT, 1944

Postponement of Operation

The Minister of Health announces that owing to certain difficulties—mainly of a legal nature—arising out of Departmental proposals for the revised Milk and Dairies Regulations, it has been decided in consultation with the Minister of Agriculture and Fisheries and the Minister of Food that it will not be practicable to bring the above-mentioned Act into operation this year.

Consultations with the interested organisations with regard to the revision of the Milk and Dairies Regulations and the Milk (Special Designation) Regulations, to come into operation with the Act, will be arranged as soon as the above-mentioned difficulties have been resolved. In the meantime, the Minister requests authorities to make any necessary arrangements for the renewal of licences under the Milk (Special Designations) Regulations for the year 1949, and for the continued execution of any other of their duties in relation to the production of milk.

NOTES AND NEWS

Diary of Events

Oct. 12th.—Scientific Meeting of the Zoological Society of London, Regent's Park, N.W.8, 5 p.m.
Oct. 14th.—Meeting of the Dumfries and Galloway Division, N.V.M.A., at Dumfries (Station Hotel), 2 p.m.
Oct. 15th.—Meeting of the Mid-West Division, N.V.M.A., at Bristol Berkeley Café, Clifton), 2.15 p.m.
Oct. 20th.—Meeting of the Section of Comparative Medicine, Royal Society of Medicine, 1, Wimpole Street, W.1, 5 p.m.
Oct. 21st.—Meeting of the Western Counties Division, N.V.M.A., at Exeter (Rougemont Hotel), 2 p.m
Oct. 21st.—Meeting of the South Eastern Division, N.V.M.A., at the Royal Veterinary College, Camden Town, N.W.1, 2.30 p.m.
Oct. 28th and 29th.—N.V.M.A. Conference on "Grassland and Animal Health," at the Wellcome Foundation, 183, Euston Road, London, N.W.1.
Oct. 28th.—Meeting of the Lincolnshire and District Division, N.V.M.A., at Lincoln (Saracen's Head Hotel), 2.15 p.m.

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N.V.M.A. Conference on "Grassland and Animal Health"

With our last issue we circulated to members, as an inset, a copy of the final programme of the N.V.M.A. Conference on "Grassland and Animal Health" to be held at the Headquarters of the Wellcome Foundation, 183-193, Euston Road, London, N.W.1, on October 28th and 29th, together with a detachable slip, upon which members were requested to intimate their luncheon requirements, returning signed to the General Secretary not later than October 25th. *Members who propose to attend the Conference, but who will not require the arranged luncheon, are nevertheless asked to inform the General Secretary of their intention to be present.*

Members wishing to do so may bring one or two of their agricultural clients to the conference if they would be interested. Tickets for such *non-members* of the Association are available on request from the General Secretary.

* * * * *

THE EMERGENCY RESERVE

Position of Veterinary Personnel

The Ministry of Labour has issued a list of employments from which volunteers will not be accepted for the emergency reserve, which is made up of Class "Z" reservists who will report for duty at once in an emergency. This list does not apply to the regular or Territorial forces, nor is it a full schedule of reserved occupations such as would be brought into force in the event of mobilisation. Such a list is now being worked out by the Government in consultation with the two sides of industry.

It applies only to the scheme to enrol volunteers with valuable service experience who would be urgently needed for operational duties in the very early stages of an emergency, and contains only a limited range of employments of exceptional importance. It is in two parts, the second applying to people who can be accepted only provisionally. These are mostly people with specialist qualifications, who will be accepted in limited numbers for specialist work only. In some of these cases decisions will be made on an individual basis.

The first part, relating to *persons who cannot be accepted for the time being*, includes medical, dental, veterinary and pharmaceutical students, and students for a degree or equivalent qualification in, *inter alia*, science and agriculture.

The second part, relating to *persons who can be accepted only provisionally*, includes members of the medical profession, dentists, veterinary surgeons and pharmacists; also radiographers and pathological laboratory assistants.

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PERSONAL

Appointment.—Mr. Alan G. Warren, B.Sc., M.R.C.V.S., Demonstrator in Animal Husbandry at the Royal Veterinary College, Camden Town, is leaving for the Sudan to take up, as from September 29th, the post of Lecturer in Surgery and Medicine at the Khartoum Veterinary School, Gordon Memorial College, Khartoum.

Forthcoming Marriage.—Noble—Harper.—The engagement is announced between Claude Noble, M.R.C.V.S., of Woodbank, Crossgates, Fife, and Christine Harper, of 8, Avondale Road, Wolverhampton, Staffs.

Births.—Bateman.—On September 30th, 1948, at the Phyllis Memorial Maternity Home, Melton, Suffolk, to Doreen (*née* Fawbert) and H. Norman Bateman, M.S.R.C.V.S.—a brother for Bill (Ian Russell).

Buckner.—On August 14th, 1948, to Betty (*née* Domminney), wife of D. R. P. Buckner, M.R.C.V.S., of L'Hyvreuse Lodge, Cambridge Park, St. Peter Port, Guernsey—a daughter, Caroline Lindsay.

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R.C.V.S. OBITUARY

Elmes, George, F.R.C.V.S., Heath Lodge, Harpenden Road, St. Albans, Herts. Graduated London, May 14th, 1896; Fellowship, December 13th, 1902. Died September 28th, 1948; aged 73 years.

Mr. George Elmes, F.R.C.V.S.

We record above with deep regret the death, which took place at his residence in St. Albans on Tuesday of last week, of Mr. George Elmes, one of our most highly esteemed South of England practitioners, whose loss will be mourned by his colleagues and by the community which he served with such ability and devotion.

Born in Harpenden in 1875, George Elmes was educated at the Haberdashers School, London, and trained for the career of his choice at the Royal Veterinary College, from which he graduated in 1896. Then started a great record of work as a practitioner in St. Albans, where as a skilful, conscientious exponent of veterinary surgery he upheld the best traditions of his profession for 50 years, latterly in partnership with Mr. A. Shenton. Mr. Elmes was Veterinary Officer to the St. Albans City Council for 38 years, until his retirement a year and a half ago, while his gift of exposition rendered him a very acceptable Lecturer in Veterinary Science at the Hertfordshire Institute of Agriculture. During the 1914-18 war he acted as Purchasing Officer, also officer in charge of the "mange camp" at Harpenden, where army horses were cared for.

George Elmes was a great huntsman, being a member of the Hertfordshire Hunt and the Aldenham Harriers, and won many trophies for point-to-point racing and jumping. He was, indeed, outstanding as an outdoor sportsman in his younger days, being a good shot and polo player.

Profound sympathy is felt for Mr. Elmes in her loss.

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VACCINATION OF CATTLE WITH STRAIN 19

Conference in Edinburgh

Methods of controlling contagious abortion in cattle, and the effect of the use of Strain ·19 vaccine on the pedigreed cattle export trade, were discussed in Edinburgh recently at a conference called by the N.F.U. of Scotland and attended by representatives of the beef and dairy breed societies and the Royal Highland and Agricultural Society.

Mr. W. Young, Skerrington Mains, Hurlford, chairman of the Union's Milk Committee, who presided, said that breeders were greatly concerned in some cases by the effects of the vaccination by Strain 19 on cattle. "We are extremely anxious that the health of our animals should be safeguarded," he said, "and that export trade should not be hindered."

Professor Dalling said vaccination against this disease was nothing new. Strain 19 he described as an ideal preparation for the purpose. "We have carried out a long series of observations on 50 herds in the South of England," he said, "as a result, we know that Strain 19 does give resistance of a high order whereby the natural disease and the artificially induced disease can be warded off."

Mr. J. N. Ritchie, head of the Scottish animal health division of the Ministry, dealing with the problem of the refusal by purchasers to buy British cattle for export while they were showing reaction to vaccination, said it was possible that in herds in which the disease was well under control it might be better to withhold vaccination until they could decide which animals were eligible for export. "We have been able," he said, "in consultation with some importers of animals to arrange that they will accept vaccinated animals although there is a slightly positive reaction."

During discussion, Mr. Young said the Union were concerned to know why reaction to the vaccine persisted during practically all the lifetime of some animals.

Regarding complaints the Ministry had received about difficulty in exporting vaccinated cattle, Mr. Ritchie said investigation showed that in most cases the animals had been vaccinated late, *i.e.*, at over one year of age, and they were animals which would be expected to retain the reaction longest.

Major R. F. Brebner, of Dalmeny, asked whether part of a herd which had not been vaccinated was liable to be infected by the animals which had been. Professor Dalling replied that it had been shown that there was no transmission whatever from vaccinated animals.

Replying to a question whether he considered that compulsory vaccination against the disease might be introduced in the near future, Professor Dalling said they were not at that stage yet.

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FIELD SPORTS CAMPAIGN

Organised Defence

"Criticism of field sports," says *The Times* in its issue of September 29th, "has prompted the British Field Sports Society to seek support for a 'countryman's and sportsman's pledge.' Signatories will be asked to affirm their belief that 'the old-established country pursuits of hunting, fishing, shooting, and other field sports are an essential part of the rural life of the country, and that they provide health-giving recreation for all who live on, and make their livelihood from, the land, and also for a great and increasing number of townspeople.'

"It was stated in London last evening that in preparation for the campaign, which will begin on October 1st, the society has established 250 local field sports committees with 20,000 parish representatives.

"Mr. J. Fitzwilliam, secretary of the society, said the opponents of field sports claimed the support of 400 M.P.s for a Bill to prohibit hunting and coursing. The majority of these represented urban constituencies and were probably influenced by a suggestion that the farming community were awaiting an opportunity to bring hunting to an end.

"It had been intimated on behalf of the N.F.U. that 40 out of the 59 county branches had expressed strong disapproval—many in vigorous terms—of any proposal to curtail field sports. The Council of the N.F.U. had decided to co-operate with the society to counter the campaign by opponents of field sports.

"The Duke of Beaufort, president of the society, said that almost everyone who hunted to-day was in some way connected with farming, and many hunting packs were now run entirely by farmers."

* * * * *

SCHOLARSHIPS IN ITALY, 1948-49

The Italian Government offers at least five scholarships to members of British universities and colleges for study at a university or other higher educational institution in Italy during the academic year 1948-49.

Scholarship holders will receive the following: (a) An allowance of 37,500 liras (£20 approximately) per month. This sum is calculated as being sufficient to cover the cost of reasonable food and accommodation; (b) Remission of university or college fees; (c) Half the cost of travel from the Italian frontier to the approved place of study in Italy.

If five scholarships are given they will each be for eight months. It is possible that some scholarships may be for eight months and some for four months, and in this case the total number of scholarships will be increased accordingly. Scholarship holders will be required to pay their own fares as far as the Italian frontier. The return fare from London to the Italian frontier is approximately £16 2nd class and £11 3rd class. The Italian authorities will assist scholarship holders to find suitable accommodation which will, if possible, be in either a student's hostel or a pension.

Conditions.—(a) Candidates must be of British nationality; (b) Preference will be given to graduates; (c) A knowledge of Italian is desirable; (d) No extra payment will be made to married candidates and no special assistance can be given to candidates wishing to take their wives with them.

Any enquiries regarding the conditions of award should be addressed to the Italian Embassy, 14, Three Kings Yard, London, W.1.

Method of Application.—No special form is required. Applications should state for which length of scholarship candidates wish to be considered, and must be accompanied by: (a) A full statement of the candidate's academic record; (b) A recommendation from the candidate's tutor or professor; (c) A statement, to be as detailed as possible, of the subject of study contemplated in Italy; (d) A stamped addressed envelope for acknowledgment.

Applications, which must be received by October 16th, 1948, should be addressed to: The Controller, Education Division, The British Council, 3, Hanover Street, London, W.1.

Applications will be acknowledged and candidates will be informed if they are required to attend for interview. Interviews will take place in London on October 25th, 1948.

First International Congress of Physiology and Pathology of Animal Reproduction and of Artificial Insemination

RESOLUTIONS

The first International Congress for Physiology and Pathology of Reproduction, after hearing many interesting and useful papers dealing with various aspects of physiology and pathology of reproduction and artificial insemination in farm animals, met in final plenary session on Wednesday, June 30th, 1948, where it adopted the following resolutions having a bearing on the over-all problems confronting the Congress:

(1) The Congress *having considered* the need for continuing and expanding fundamental research aimed at the improvement of techniques (including artificial insemination) used in improving reproductive efficiency in livestock, and in the sound application of both old and new techniques, *recognises* the importance of such research to livestock improvement, and *recommends* that governments give careful consideration to the strengthening of their existing institutions where research is being done on physiology of reproduction and pathology, in all the aspects of these subjects having a bearing on efficient reproduction and the effective use of artificial insemination in animal husbandry practice.

(2) The Congress in *considering* the need for fundamental research, *recognises* the importance of close collaboration between workers trained in various sciences (*i.e.*, anatomy, animal production, bacteriology, chemistry, genetics, physics, physiology, etc.) and *recommends* that research programmes be so organised that full co-operation is assured among workers in the various scientific disciplines within institutions, between institutions within countries, and between and among countries when common problems arise which require co-ordinated international attacks to arrive at satisfactory solutions.

(3) The Congress, considering further the ways in which close collaboration between scientists may be assured, *recognising* the importance of strong national scientific societies where workers having common interests in the many aspects of livestock improvement may meet to exchange information and ideas, and the importance of international meetings where workers from various countries may meet with fellow workers from all parts of the world to explore common problems, *recommends* that careful consideration be given to the development of strong national animal husbandry and veterinary societies, and that international congresses be organised at sufficiently frequent intervals to facilitate exchange of new information among scientists from all countries, and that meetings of smaller, more specialised groups be encouraged whenever required to bring about more effective research on either national or international scales.

(4) The Congress, *having considered* ways in which future congresses and/or meetings might be organised, and *recognising* the importance of close collaboration with other international groups that will deal with various aspects of the physiology and pathology of reproduction, including artificial insemination, *recommends* that a standing committee be appointed to make plans for future congresses and/or meetings and that this committee maintain close contact with the proposed European and International Animal Husbandry Associations, and any other Continental Associations which may become Associated with the International Associations and the permanent committee of the existing International Veterinary Congress, the International Physiological Congress, the International Genetics Congress and any other groups that may be directly interested in improving reproductive efficiency in livestock, and that future congresses and/or meetings be so planned that any unnecessary duplication of effort will be avoided. In adopting this recommendation, the Congress authorises the Board of Chairmen to appoint a Standing Committee on the Physiology and Pathology of Animal Reproduction including artificial insemination, composed of nine members subject to approval by the Congress with the understanding that the Standing Committee will take such actions as it may deem necessary to convene a second Congress within about three years, or in other ways facilitate exchange of information between scientists at an international level. The Congress further authorises the Standing Committee to consider close collaboration or amalgamation with other groups, such as the proposed International Animal Husbandry Association, in arranging for congresses and/or meetings, if such collaboration is in the interest of efficiency, both in exchanging information and in reducing travelling expenses of workers who may wish to participate in two or more congresses if held independently. The Chairman of the Standing Committee is authorised to fill vacancies which may occur in the Committee, until such time as a new Committee may be constituted, or until the Committee may be dissolved for any other reason. The Board of Chairmen will also designate the seat of the Standing Committee, which will be in the country of either the chairman or secretary of the Standing Committee.

The Congress, in final plenary session, also considered certain specific problems and adopted the following resolutions:

(5) The Congress, *recognising* the importance of brevity in scientific writing, *recommends* that the abbreviation "A.I." be adopted internationally to denote "artificial insemination."

Certain other resolutions were placed before the Board of Chairmen for consideration.

It was not considered possible to place them before the Congress, either because the time was not opportune, or because there was no real hope of realising their intent under existing conditions, and they have therefore been referred to the Standing Committee on Physiology and Pathology of Reproduction (including Artificial Insemination) for consideration.

(6) Finally, the members of the Congress, having enjoyed to the full both the scientific and social arrangements made on their behalf, wish to express their deep appreciation to the University of Milan and the Spallanzani Institute under whose auspices the Congress was held, to the Honorary Committee for its assistance in making the Congress possible, to the Executive Committee for planning the Congress, to the Board of Chairmen and Chairman and Vice-Chairmen of the several sections for guiding the work of the Congress, to the Secretary General for his untiring efforts in making the Congress a success, to the interpreters and secretaries for their efficient and faithful assistance, and to the Italian people for their unequalled hospitality. The Congress also expresses its appreciation to the Italian Government for its support and co-operation in making the Congress a success.

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In addition to the above resolutions, the Delegate from Spain introduced the following resolution, which was adopted by the final session of the Congress:

(7) As President of the Spanish Delegation I deem to express the unanimous wish of all delegations of the Congress by presenting the following order of day which I beg the Congress to accept:

The Congress partakers express their gratefulness for the organisation and for the results obtained and confirm their admiration for the work performed by the Italian Experimental Institute—Lazzaro Spallanzani—and by its directors. Considering that the seat of the Institute has been completely gutted and that it was not possible to build a new seat, the Congress express their deepest wishes that the technicians of the Institute may be able to perform soon in a new seat their productive, scientific and experimental activity which is appreciated all over the world, so that they may accomplish their work in the interest of animal husbandry and for international scientific collaboration.

Standing Committee on Physiology and Pathology of Reproduction

The following scientists were appointed by the Board of Chairmen of the Congress and approved by the Congress, to serve as a Standing Committee on Physiology and Pathology of Reproduction in accord with resolution No. 4 adopted by the Congress:

J. Anderson (Kenya), T. Bonadonna (Italy), E. Garcia Mata (Argentina), R. M. C. Gunn (Australia), J. Hammond (Great Britain), N. Lagerlöf (Sweden), G. Lesbouvries (France), B. B. Morgan (United States of America), and E. Sörensen (Denmark).

Dr. Hammond and Professors Lagerlöf and Sörensen will constitute a Board of Chairmen of the Committee, and these three will select among themselves a chairman, after which the other two will serve as vice-chairmen of the Committee. The chairman and vice-chairmen will name a secretary of the Committee from among the other six members, and shall decide whether the address of the chairmen or of the secretary shall be designated as the seat of the Committee.

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Just after the end of the Congress, the Standing Committee held its first meeting, and appointed Professor N. Lagerlöf (Sweden) as chairman and Professor T. Bonadonna (Italy) as secretary.

The seat of the Committee will be the secretary's in Milan.

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THE VETERINARY INVESTIGATION SERVICE

We publish below, without comment, but with a view to keeping our readers informed of the current trend of farming opinion, the following note which appeared in the issue of the *The British Farmer* of September 30th:

"All farmers who are owners of livestock should be aware of the Veterinary Investigation Service, which is now in the charge of the Director of the Ministry of Agriculture's Veterinary Laboratory, Weybridge.

"Under this service the Veterinary Investigation Officer's main function is to assist veterinary surgeons in the diagnosis of causes of illness and disease in all types of livestock: he does not, however, give advice of the kind normally obtainable by stock owners from a veterinary surgeon.

"The Veterinary Investigation Officer may suggest methods of treatment, especially recently discovered treatments: in such cases he may make personal observations on the progress of the animals under treatment, but as a general rule, the Veterinary Investigation Officer does not have direct contacts with stock owners, and assistance is usually given through the owner's veterinary surgeon. It follows from this that if a veterinary surgeon does not suggest enlisting the help of the Veterinary Investigation Officer in cases of difficulty the farmer should request him to make the approach.

"In the unlikely event of a veterinary surgeon not wishing to take advantage of the assistance available under the Veterinary Investigation Service, the farmer should approach the Ministry of Agriculture's Divisional Inspector in his area.

"In the case of poultry disease, the poultrykeeper may seek advice through the Poultry Advisory Officer or the Divisional Veterinary Inspector: if necessary, the Veterinary Investigation Officer will then be called in."

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IMPERIAL STABLE FOR ABYSSINIA

The Daily Graphic reports that the Emperor Haile Selassie is planning to build up an Imperial stable in Abyssinia and that, to this end, horse breeders in Australia have been commissioned to buy, on the Emperor's behalf, £25,000-worth of the best horse-flesh they can find. Among other items on the Imperial order are six pairs of carriage greys. These have been found, and will soon be shipped out to Addis Ababa. Two stallions and six brood mares are also wanted, all to be of impeccable breeding. "The total order is for 1,000 horses, a veterinary surgeon and some expert horsemen."

* * * * *

At the Royal Sanitary Institute, 90, Buckingham Palace Road, on Wednesday, October 13th, at 2.30 p.m., a discussion on "The Control of Milk Quality" will be opened by E. B. Anderson, M.Sc., F.R.I.C., Chief Chemist, and L. J. Meanwell, N.D.D., of United Dairies, Ltd. The chairman will be Dr. Charles Porter, Vice-President of the Institute.

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ADDRESSES OF DISEASE-INFECTED PREMISES

The list given below indicates, first, the county in which are situated the premises on which disease has been confirmed, followed by the postal address and date of outbreak.

Swine Fever:

Lincs. (Holland).—The Sycamores, Saracen's Head, Whaplode, Spalding, Lincs. (Oct. 4th).

Sheep Scab:

Lancs.—Pemmin Farm, Wardle, Rochdale, Lancs. (Oct. 1st).

CORRESPONDENCE

The views expressed in letters addressed to the Editor represent the personal opinions of the writer only and their publication does not imply endorsement by the N.V.M.A.

Correspondents are requested to write as briefly as possible.

THE ORGANISATION OF RESEARCH

Sir,—Veterinary science is by definition an applied science comprising those parts of biology, physics, etc., which have some bearing on the control of disease among domestic animals. The distinction between "fundamental" and "applied" science is an increasingly artificial one to-day, when more and more facts uncovered by "fundamental" scientists are found to have practical applications for modern civilisation. In veterinary science this distinction should never have existed.

In different kinds of veterinary work the real distinction is between short-term and long-term projects. I was glad to see that one contributor to the discussion reported in your issues of September 18th and 25th did stress the fact so often overlooked by our more self-conscious "fundamentalists" that the good clinician must be a scientist, whose observations are as valuable to research as any other scientist's. The unknown facts he attempts to discover are simply, "What, if anything, is wrong with this particular animal and what, if anything, can be done about it?" This is as important a human problem as the most "fundamental" question of the most abstract philosophy, and the answer to it must be sought with the same reverence for facts which alone distinguishes scientists from others. By observation and deduction, often done with uncanny speed and accuracy, the clinician may investigate 20 to 30 such problems a day.

Behind him, taking up any problems the clinician cannot solve alone, comes the investigation officer. He probably requires as many days as the clinician spends minutes for each piece of routine diagnosis. If not grossly overworked he can also solve problems affecting, perhaps, several different practitioners by a short-term experiment taking a few weeks or months, or involving part-time, seasonal work over several years.

Behind the investigation officers should be teams of specialists doing long-term research work on particular kinds of disease instead of particular cases of it. This work may or may not benefit animal husbandry within the lifetime of those doing it, but there is gradually built up a library of newly discovered facts which investigation officers can consult at will, and from which they can select those likely to have immediate applications for the clinician.

That the three kinds of work require workers of different gifts and temperaments is obvious. While the organisational framework of any of these sections is undoubtedly capable of improvement, my own view is that the most crying need of English veterinary science to-day is for more and better investigation services to bridge the deplorable gap between the research worker who considers "practice" an unlovely trade and the clinician who considers "research" an ivory tower.

Yours faithfully,

11, Domonic Drive, Connie M. Ford.
London, S.E.9.
September 28th, 1948.

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LONG-CONTINUED LACTATION WITHOUT PREGNANCY

Sir,—During the course of routine inspection of non-designated herds I came across a cow with an astonishing history. She was a pure bred Guernsey and had her last calf in October, 1941. Since that date she has been milking steadily and is to-day giving two gallons of milk. In the inter-war period I attended a cow with a similar history of a five years' lactation period.

All methods to get the above seven year lactating cow pregnant have proved unsuccessful. Does this seven years of constant lactation without having been "in calf" constitute a record?

Yours faithfully,

Vean House, J. Cochrane-Dyet.
Camborne, Cornwall.
September 30th, 1948.

DISEASES OF ANIMALS ACTS, 1894 TO 1937, AND AGRICULTURE ACT, 1937 (PART IV).

Summary of Returns of Confirmed Outbreaks of Scheduled (Notifiable) Diseases

Period	Anthrax	Foot-and-mouth	Fowl Pest	Parasitic Mange*	Sheep Scab	Swine Fever
Sept. 1st, to 15th 1948	3	1	7	—	6	—
Corresponding period in—						
1947	9	—	44	—	16	6
1946	2	—	—	—	20	11
1945	2	8	—	—	2	43
Jan. 1st to Sept. 15, '48	70	1	247	1	39	22
Corresponding period in—						
1947	76	103	760	1	57	26
1946	67	31	—	7	61	317
1945	80	109	—	6	51	702

Note.—The figures for the current year are approximate only.
* Excluding outbreaks in Army Horses.

Advertiser's Announcement

C. J. Hewlett & Son, Ltd., are now able to supply Calcium Boro-Gluconate Injection with the addition of phosphorus and magnesium, under the name Calcium Boro-Gluconate P-M. The amount of phosphorus present in the solution is half the calcium content so that this proportion is identical to that normally found in the blood of the cow. For this reason the injection may be made either subcutaneously or intravenously.

The inclusion of magnesium in solutions of this type is useful for its effect in stabilising the calcum in the blood stream.

This improved formula, which may be used for any calcium deficiency, is indicated particularly to prevent relapses in milk fever cases.

A second formula, which is available under the name Calcium Boro-Gluconate P-M-D, has the addition of 20 per cent. of dextrose. This would appear to be the injection of choice in cases of milk fever complicated with acetonaemia.

NATIONAL VETERINARY MEDICAL ASSOCIATION OF GREAT BRITAIN AND IRELAND

Conference on "Grassland and Animal Health"

October 28th and 29th, 1948,

At the Headquarters of the Wellcome Foundation,

183-193, Euston Road, London, N.W.1

First Day, October 28th:

11 a.m.	Official opening of the Conference.
11.15 a.m.	Opening paper: "Grassland Development and the Expansion Programme for England and Wales." Mr. W. D. Hay, Grassland Development, Ministry of Agriculture.
12.30 p.m.	Luncheon.
2 p.m.	"Grassland Management for Animal Production." Sir George Stapledon, C.B.E., M.A.
2.45 p.m.	"Chemistry of Grassland." Professor R. G. Baskett, Agricultural Chemistry Department, The Queen's University, Belfast.
3.15 p.m.	Fifteen minutes' break for tea.
3.30 p.m.	"Recent Developments in Seeds Mixtures." Dr. William Davies, Director, Grassland Improvement Station, Stratford-on-Avon.
4.15 p.m.	"Habits of the Grazing Animal." Professor Martin Jones, M.Sc., Department of Agricultural Botany, King's College, Newcastle-upon-Tyne.
4.45 p.m.	General discussion. Opening speakers: Professor W. C. Miller, M.R.C.V.S., F.R.S.E.; Mr. William Alexander, O.B.E., Home Farm, Eynsford, Kent; Dr. W. S. Gordon, C.B.E., M.R.C.V.S.

Second Day, October 29th:

9.30 a.m.	Opening paper: "Grassland in Relation to Animal Health." Mr. G. N. Gould, M.R.C.V.S.
10.15 a.m.	"Parasites and Grassland." Dr. E. L. Taylor, M.R.C.V.S., D.V.H.
10.45 a.m.	Fifteen minutes' break for tea.
11 a.m.	"Major and Minor Mineral Elements in Relation to Animal Health and Pasture Management in the British Isles." Dr. H. H. Green, Ministry of Agriculture, Veterinary Laboratory, Weybridge.
11.30 a.m.	"The Oestrogenic Factor in Subterranean Clover in Australia." Mr. D. H. Curnow, M.Sc., Courtauld Institute of Biochemistry, Middlesex Hospital Medical School, London.
11.50 a.m.	"A Factor in Pastures Affecting Muscle Activity." Mr. W. S. Ferguson, F.R.I.C., Jealott's Hill Research Station, Imperial Chemical Industries, Ltd.
12.30 p.m.	Luncheon.
2 p.m.	"Physiological Dysfunctions and Metabolic Disorders in Grazing Animals." (1) "Significance of Vitamins; Acetonaemia; Photosensitisation." Mr. W. R. Muir, B.Sc., National Agricultural Advisory Service.
2.30 p.m.	(2) "Hypocalcaemia, Hypomagnesaemia, Hypophosphataemia and Fog Fever." Captain J. R. Barker, M.R.C.V.S., D.V.H.
3 p.m.	General discussion. Opening speakers: Mr. A. Messervy, M.R.C.V.S.; Dr. W. R. Wooldridge, M.Sc., M.R.C.V.S., and Professor A. N. Worden, M.A., B.Sc., M.R.C.V.S., A.R.I.C.
4.45 p.m.	Summing-up by Professor T. Dalling, M.A., M.R.C.V.S.